

WATER VENDING APPARATUS

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a continuation application of U.S. patent application Ser. No. 15/945,153, filed Apr. 4, 2018 and entitled Water Vending Apparatus, now U.S. Pat. No. 10,744,421, issued Aug. 18, 2020c (Attorney Docket No. X16), which is a continuation application of U.S. patent application Ser. No. 14/543,436, filed Nov. 17, 2014 and entitled Water Vending Apparatus, now U.S. Pat. No. 9,937,435, issued Apr. 10, 2018 (Attorney Docket No. P24), which is a continuation of U.S. patent application Ser. No. 13/751,897, filed Jan. 28, 2013 and entitled Water Vending Apparatus, now U.S. Pat. No. 8,888,963, issued Nov. 18, 2014 (Attorney Docket No. K16), which is a continuation application of U.S. patent application Ser. No. 12/541,625, filed Aug. 14, 2009 and entitled Water Vending Apparatus, now U.S. Pat. No. 8,359,877, issued Jan. 29, 2013 (Attorney Docket No. H56), which claims priority from U.S. Provisional Patent Application Ser. No. 61/089,295, filed Aug. 15, 2008 and entitled Water Vending Apparatus Having Water Vapor Distillation Purification System (Attorney Docket No. G38), each of which is hereby incorporated herein by reference in its entirety.

TECHNICAL FIELD

[0002] The present invention relates to vending purified water and more particularly, to a water vending apparatus.

BACKGROUND INFORMATION

[0003] There is a large, poorly satisfied global need for readily available, adequate tasting, safe, affordable and convenient drinking water. The ability to serve this global need is limited by many factors, one being the economics of the centralized bottling model. Traditionally, less affluent consumers are not well served by branded water as price increases with respect to water quality and trustworthiness. Distributed purification alternatives, such as chemical treatment and carbon filtration, have limited impact on water safety and have significant limitations for consumers, retailers, bottlers, and brand owners.

[0004] Water kiosks, i.e., locations, providing containers of water which are typically filled at an off-site location and transported to the kiosk, are prevalent in cities with poor municipal water supplies, and are an inefficient and expensive solution to providing safe drinking water to the masses. Kiosks typically sell water by the jug, and the cost of transport, bottling, and distribution are all passed to the consumer. Environmentally, transport of kiosk-related water jugs increases pollution and traffic congestion.

[0005] Additionally, the volume of water capable of being stored at a kiosk in jug-form is finite. In locations such as Mexico City, for example, reducing the number of jugs required to adequately meet the demand for purified water may help resolve the serious logistical problems of the water kiosk. Accordingly, there is a need for an efficient, more reliable, and less expensive means of distributing safe and adequate tasting drinking water.

SUMMARY

[0006] In accordance with one aspect of the present invention, a water vending system is disclosed. The water vending

system includes a water vapor distillation apparatus and a dispensing device. The dispensing device is in fluid communication with the fluid vapor distillation apparatus and the product water from the fluid vapor distillation apparatus is dispensed by the dispensing device.

[0007] Some embodiments of this aspect of the present invention include where the water vapor distillation apparatus includes a source fluid input and an evaporator condenser. The evaporator condenser includes a substantially cylindrical housing and a plurality of tubes in the housing. The source water input is fluidly connected to the evaporator condenser and the evaporator condenser transforms source water into steam and transforms compressed steam into product water. The water vapor distillation apparatus also includes a heat exchanger fluidly connected to said source water input and a product water output. The heat exchanger includes an outer tube and at least one inner tube. The water vapor distillation apparatus also includes a regenerative blower fluidly connected to the evaporator condenser. The regenerative blower compresses steam, and whereby the compressed steam flows to the evaporative condenser where compressed steam is transformed into product water.

[0008] Some embodiments of this aspect of the present invention may include one or more of the following: where the water vending system includes a programmable logic controller, where the water vending system includes a primary tank and a secondary tank; where the water vending system includes a fill pump wherein the fill pump pumps water from the primary tank to the secondary tank; where the water vending system includes a diffuser in the secondary tank; where the water vending system includes at least one sensor; where the water vending system includes a minimum volume sensor in the primary tank whereby the minimum volume sensor determines whether the primary tank is holding a minimum volume to fill the secondary tank; where the water vending system includes a maximum volume sensor in the primary tank whereby the maximum volume sensor determines whether the primary tank is full; where the water vending system includes an air flow conduit between the primary tank and the secondary tank; where the water vending system includes an ultraviolet sterilizer coupled to a fluid path between the primary tank and the secondary tank; where the water vending system includes a nozzle assembly downstream from the secondary tank; and/or where the water vending system includes an ultraviolet sterilizer coupled to a fluid path between the secondary tank and the nozzle assembly.

[0009] In accordance with one aspect of the present invention a water vending system is disclosed. The water vending system includes a water vapor distillation apparatus and a dispensing device, wherein the dispensing device is in fluid communication with the water vapor distillation apparatus and whereby product water from the water vapor distillation apparatus is dispensed by the dispensing device. The water vapor distillation apparatus also includes a programmable logic controller for controlling the dispensing device and the water vapor distillation apparatus.

[0010] Some embodiments of this aspect of the present invention may include one or more of the following: a multi-purpose interface comprising at least one conductivity sensor; and/or a proximity sensor, the proximity sensor sends a signal to the programmable logic controller to dispense water. Some embodiments of this aspect of the